BUILD THIS COZY CABIN

Anyone with basic carpentry skills can construct this classic one-room cabin for under $4,000.

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Rays of early-morning sunlight gently peek through the windows, easing you awake. Looking down from the sleeping loft, you see everything you need: a pine table, a box of split firewood, and a compact kitchen in the corner. This is the cabin dream.

On the following pages, I'll show you how to build a 14-foot-by-20-foot cabin with a sleeping loft over the porch, all for about $4,000 (see Page 81 for the design). I will alert you to the main challenges of framing a cabin and explain how to clear the most important hurdles. Even if you never build a cabin of your own, these basic instructions will be useful when building a garage, shed or other outbuilding.

I believe in building for the long haul. When it comes to cabins, this means working to the same standards of durability and beauty that you'd apply to a full-size house, even though the style, size and soul of a good cabin are entirely different. I'm sold on durability because it takes such small amounts of extra care, materials and money to yield a huge increase in longevity. Although a cabin certainly can be framed less stoutly than the design I'll show you here, I'm convinced the wisest use of resources often means going beyond what's merely good enough.

A Firm Foundation

Every well-built structure begins with the foundation. In regions where frost isn't an issue, site-poured 16-inch-by-16-inch-by-6-inch shallow-depth concrete pads work just fine. If this is similar to the approach used on new houses in your area, then it's OK for use under your cabin.

Cold climates are a different matter, and one of the best cabin foundations you can choose is established easily with minimal tools and time. Concrete piers extending below the frost line, poured within round cardboard tubes, are a time-proven approach to lightweight construction that offers a couple of advantages. Besides raising the structure off the ground and isolating it from the annual freeze/thaw movements of the soil, concrete piers provide good support around the perimeter of your cabin, without the need for full-scale forming and pouring.

In this cabin design, you need one pier at each corner of the cabin, one in the middle of each long side, three piers spaced evenly on the front of the porch and one in the middle of the rear wall. In light soil, it's reasonable to dig the 10 holes you need for 8- to 12-inch-diameter pier forms using a long-handled shovel. Otherwise, call in a neighbor or contractor with a tractor-mounted auger. You can use 8-inch concrete piers, but the larger size is more forgiving if you don't get the alignment just right.

The best way to mark your foundation outline is with 12-inch spikes pushed into the earth and connected with nylon string. Regardless of the foundation design, the main construction challenge is the same: leveling the top of the foundation pads or piers. Try to borrow a laser level from a friend to successfully level the foundation.

When setting concrete pier forms in the ground, dig the holes large enough to allow room for side-to-side adjustment. The outside edges of the pier forms should extend a bit beyond the outer dimensions of your building. As inexpensive insurance against frost jacking of foundation piers (when the piers are pulled toward the surface by seasonal freezing, even though they extend below the frost line), wrap the outside of each pier tube with black polyethylene plastic before setting them into the holes and packing soil around them. While the concrete is wet, vertically embed five-eighths-inch L-shaped threaded metal rod anchors, extending at least 7 inches above the concrete, short end down. Later on, these will hold down the base of the floor frame.

Building the Floor Frame

There are many ways to frame a cabin floor, but I favor the timber-rim approach. "Timber rim" refers to a load-bearing frame of timbers that defines the perimeter of the floor area. It's better than a continuous foundation wall because it eliminates

Cost Estimates for Your Cabin

The following includes the frame, rough floors and shingled roof, but not windows, doors and exterior siding. All costs are rounded up to account for miscellaneous expenses.

TOTAL COST: UNDER $4,000

Floor assembly: $900

- two 20' 6 x 6 rot-resistant beams (timber rim, length sides)
- two 14' 6 x 6 rot-resistant beams (timber rim, width sides)
- 27 14' 2 x 10 boards (blocking, joists and headers)
- nine 5/8" plywood tongue-and-groove subfloor panels

Walls and porch frame: $1,000

- 50 8' 2 x 8 studs (walls)
- 15 14' 2 x 6 boards (wall plates)
- five 8' 6 x 6 rot-resistant wooden posts (porch)
- one 14' 6 x 6 rot-resistant beam (porch)
- 21 7/16" oriented strand board wall siding panels (wall planks)
- six 14' 2 x 6 fascia boards (exterior wall trim)

Roof: $1,500

- 34 12' 2 x 8 boards (rafters)
- two 12' 2 x 10 boards (ridge board)
- 17 14' 2 x 6 boards (cross ties)
- four 8' 2 x 4 studs (rafter support)
- two 20' 2 x 8 boards (blocking)
- 17 3/4" spruce plywood panels (roof planks)
- wooden shakes for 550 square feet of roof surface; roof liner; gutter apron

Hardware: $350

- six 12" spikes (foundation markers)
- 10 10" Sonotubes (pier forms)
- 10 5/8" threaded rod anchors (foundation)
- eight 1/2" x 6" carriage bolts (header anchors)
- 10 pounds of 3 1/2" ardox (spiral-shanked) nails (wall studs, floor joists)
- 10 pounds of 2 1/2" ardox nails (subfloor, roof planks)
- eight 1/2" x 8" lag bolts (post tops)
- 15 pounds of 1" roofing nails

> I'm sold on durability because small steps yield huge increases in longevity.

the need for lots of block work or a poured foundation, offers great stability, and is durable and simple for first-time cabin builders. For this project, it provides continuous support for a building that's held up at only 10 points around its perimeter.

Start by gathering rot-resistant 6-by-6 timbers for the outer rim. Timbers for the ends of the cabin and porch should be long enough to do the job in one piece. If you need to splice two timbers together for the 20-foot cabin sides, that's fine. Just locate the splices directly on top of your concrete pads or piers. (It is possible to get away with thinner pieces of wood here, but that would require adding more piers—an option that's probably less attractive than dealing with thicker timbers.) Be sure to make half-lap corner joints to connect the rim timbers (see illustration, Page 81).

Measure, mark and drill 1-inch-diameter holes in your 6-by-6s for the five-eighths-inch threaded rod anchors you embedded in your concrete piers, then settle the timbers in place over the rods. Before bolting down the timbers, double-check that the top surfaces of the 6-by-6s are level to within one-eighth inch of each other. Pouring concrete is coarse work, and it's possible the foundation piers aren't exactly the same height now that they've hardened. Now's the time to correct any errors. Install shims underneath the uneven timbers to make them level; bolt them down tightly under 2-inch washers; then check one last time with a level. You now have a sturdy timber rim on which to begin building the cabin. As long as the bottom of the timber rim is at least several inches above the soil, natural ventilation should keep this structure strong for many decades.

The timber rim supports floor joists and headers (the frame around the joists) that in turn form the cabin and porch floor. By running joists across the 14-foot width of the building, you'll have the stiffest possible floor for a given width of joist, minimizing squeaks and ensuring long-term durability. As a general rule, 2-by-10s spaced on 16-inch centers across the span of this cabin will give you a good floor. But because the type of wood affects the total allowable span, double-check floor joist sizes with your local authority (building codes vary). Consider using 2-by-10 joists across the porch and 2-by-12s for the main floor (but if you do, remember to use a 12-inch-wide header for the main floor, or your joists will be taller than the floor frame). Using 2-by-12s raises the cabin floor slightly, creating a lip at the door that helps repel water and snow.

Regardless of the floor framing wood you choose, use four or five 3½-inch nails on each joint connecting the floor joists to the headers. Make sure the edges of your floor frame are straight. Use 3½-inch hot-dipped, galvanized nails driven at an angle to connect the floor frame to the timber rim. You also can use galvanized connector plates.

Next you'll apply a floor surface to your joists. If you want flooring that's easy to build, inexpensive and requires no maintenance for a cabin that won't see much cold weather, then three-fourths-inch softwood planks are the way to go. Even left completely unfinished, these form a fine, rustic floor that's easy to sweep clean. Over time, bare wood like this also takes on a burnished beauty. If you want a better floor to keep out drafts and bugs, consider shiplapped floorboards. They're one step up from square-edged planks, offering all the same advantages as plain boards, while preventing board-to-board gaps. The best floor option is five-eighths- or three-fourths-inch plywood, though this makes sense only when you're planning to apply a finished floor material over the top. Plywood keeps drafts out and adds an element of rigidity that dimensional lumber can't match, but it also looks unattractive.

Wall Framing

With your rough floor in place, you can now build the walls. Stud-frame construction is still the most popular approach for residential projects, and it makes sense for

Choose a Rock-Solid Start

Right from the beginning, you'll be faced with the challenge of creating an outline for your cabin that has truly square corners. To deliver accuracy, a carpenter's square just won't do it—you'll need to use geometry.

The overall width of the cabin is 168 inches, and the overall length (including porch) is 240 inches. According to the Pythagorean Theorem (Remember high school geometry class?), the diagonal line connecting these two is:

Length of diagonal = length of one side squared + length of the other side squared (then take the square root of this sum). It works out to be 293 inches for the length of the diagonal side of the Pythagorean triangle when the corner is square.

Start by laying out one side of your building, with a spike at both corners, and another spike at the porch corner—that's three spikes in a row, connected by a string. Next, grab two large tape measures and a couple of people to help hold the tape ends on the spike heads: You're about to mark the other side of the building so the corners are perfectly square.

Hook one tape measure to each corner spike (you'll need some help holding them there), and then extend both tapes so the 168-inch mark on one tape intersects the 293-inch mark on the other. The spot at which this happens is the place where one corner of the remaining cabin side should be located. Sink a 12-inch spike there. Repeat the process for the other side, then double-check that the opposite sides are the same length.

If you're building on bedrock, lay out your cabin footprint and mark the corner points with a stout felt-tip marker, then rent a hammer drill. Boring holes in the rock is the best way to establish key anchor points for the strings to define the walls of your structure. Bore oversized holes, then tie a mason's line to half-inch-wide, 6-inch-long bolts and slip them in place. Bolt size isn't critical because they just drop into oversized holes bored into the rock.

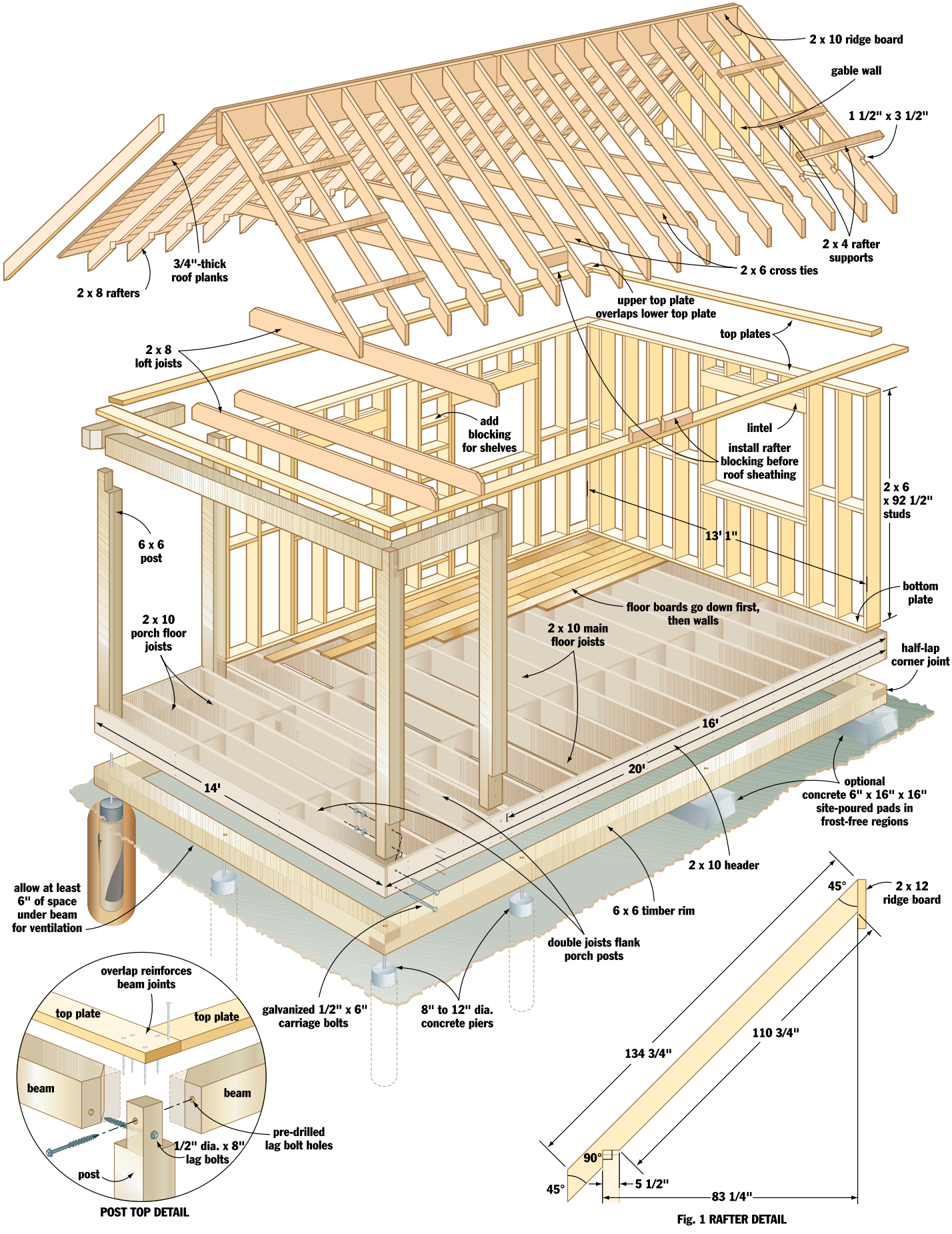

Fig. 1 RAFTER DETAIL

Exterior Options

The exterior wall treatment you choose for your cabin matters a great deal because it sets the tone for how the place looks and how much maintenance you'll be saddled with over the years. The exterior of your cabin can be made of wooden shingles, boards and battens (right illustration), wooden panels or other materials. Research the pros and cons of each material before choosing one for your cabin, and choose a material that won't burden you with much maintenance.

Cedar shingles are a terrific option because they look great in a rural setting, last many decades and are lightweight. They always live up to their reputation on roofs. On walls, cedar shingles will satisfy those people who insist on wood siding. Hand-split cedar shingles

cabins, too. Although you can save money by framing with 2-by-4s, I recommend 2-by-6s instead, even if you won't be insulating. The extra 2 inches of frame depth is stronger and looks better. The illustration on Page 81 shows how stud-frame walls have three main parts: the plates (horizontal members that form the top and bottom of the walls); studs (vertical frame members); and lintels (horizontal members that span doors and windows). Start by cutting one top and one bottom plate for the rear wall (the one opposite the door). Make these plates out of one 2-by-6 each, then temporarily screw them together so all sides are flush. Joining them together ensures the marks you make to show stud location are accurate. Make these plates 13 feet, 1 inch long. The completed front and back walls will measure 14 feet wide when flanked by the two long walls.

With the pair of plates on edge, use a carpenter's square to draw lines across the edges of the plates at the same spot. Each pencil line shows where one side of each stud should be located. An "X" marks the side of the line where the stud needs to sit. Studs measuring 92½ inches long should be spaced 16 inches apart from center point to center point, with extra studs where door and window openings will go. Before you frame openings for windows and doors, you need to know the sizes of the openings required for them. Make window openings 1 inch wider and 1 inch taller than the overall size of your window (1 inch wider and a half inch taller for a prehung door, when you get that far).

Remove the screws that temporarily held the top and bottom plates together, separate these pieces about 8 feet apart (with the bottom plate near its final place on the wall), and then position your wall studs between them. Begin by nailing the plates to the ends of the full-length studs, then cut and add shorter studs to form the window opening. Use three 3½-inch nails per joint. If you're planning to build insulation into your floor, add a second bottom plate to the wall to raise it up. Now get ready to heave the wall upright and into position.

> Softwood planks form a fine, rustic floor that takes on a burnished beauty.

Raise the frame with helpers, then push, pull and pound it into alignment with the edge of the floor frame. Use your level to align the wall so it's perfectly vertical (plumb), then drive two nails into each space between the studs on the bottom plate, extending down into the floor boards and header. Now brace the wall with some long pieces of lumber extending to the ground (you'll take them off later, so use the good stuff), then repeat the wall framing process for the two neighboring side walls.

When you've framed and raised the last wall (the one with the door), check and adjust all walls so they're straight and plumb. Don't continue until you've carefully finished this detail. Use taut strings to make sure the top edges of the walls are truly straight. When you're satisfied, get ready to cut and apply another layer of 2-by-6s over the existing top plate. You'll need to arrange these parts so they overlap the joints between wall segments, but there's another detail you need to address first. Page 81 shows you how two 6-by-6s or log posts should be installed extending from the top corners of the side walls to provide support for the porch roof. Begin by fastening two 6-by-6 vertical posts to the front corners, then rest three horizontal 6-by-6s on top, extending to the porch posts temporarily supported by props of lumber. When all this is in place, tie everything together with a second 2-by-6 top plate.

For siding, I recommend wall planks because they look so much better from the inside of your cabin. If you are looking for inexpensive siding, or you plan on insulating the wall's interior and adding interior siding (covering the 2-by-6s from the inside), you can use plywood or oriented-strand board (OSB) wall siding panels.

Roof Framing

There are many ways to frame a roof, but when you want to create usable loft space, you need to address a few design issues. The first is roof pitch. For both aesthetics and efficiency, the 12:12 pitch is best. This means the slope is 45 degrees from horizontal, with a 90 degree angle formed at the peak. The parts of your cabin that form the slope of your roof are called rafters, and cutting them accurately will be the most challenging part of building your cabin. But if you tackle the job with care, you'll succeed.

The first step is to take another look at Page 81. Fig. 1 shows a side view of the

taken from your building site are ideal if you're lucky enough to have them, but commercially sawed cedar shingles also work well.

Are you planning to install stone or brick yourself? Buy all the time you need to get the job done by installing windlock asphalt shingles (left illustration) on walls. These interlock physically, allowing you to install them vertically without the usual flapping you'd get if you tried the same thing with regular shingles. They look pretty good on their own, even if you never get around to the masonry.

For a low-cost approach to exterior siding, use either board and battens or 4-by-8 wooden panels. These two options are easy to put up, and they look good for awhile. But in time they can look shabby unless you're diligent about refinishing.

rafters you need to build. You'll need 34 in all. This includes 30 that span the cabin itself, and two more pairs that extend to create the overhangs at the porch and the rear wall. You could use 2-by-6 rafters, but if you plan to insulate, you're better off using 2-by-8s spaced on 16-inch centers. Although it costs a bit more, the extra wood actually makes it easier to create the required notches and angles because there's more wood with which to work. As with the floor joists, check with local building authorities on exactly what size of wood is required where you live.

Start by marking rafter locations where they will sit on the top of the side walls, ideally atop wall studs. Use the same "line-and-X" marking scheme you used to lay out the top and bottom wall plates. Next, measure the width of your building across the top of the side walls. It should be 14 feet. Chances are good that your cabin width across the front and back walls will match this measurement, but maybe not across the middle. No problem. Take one or two spare planks, rest them across the top of the building and spike one end of each in place. Get some help wrestling the walls inward or outward (whichever is needed to get a 14-foot building width), then spike the second end of your brace planks down. These will come off later, when the rafters and cross ties are added, so don't pound the nails all the way home. Also, make sure these temporary braces are well away from the rafter locations you marked earlier. You don't want them to get in the way of the rafters.

Follow the pattern on Page 81 (Fig. 1) and cut out a pair of rafters. Although they should fit nicely on your cabin, double-check your cuts with a tape measure. Tack a piece of 1½-inch-thick scrap wood to the top end of one rafter (to simulate the ridge board that will be part of the completed roof), then get some help temporarily hoisting the rafters up and leaning them against each other. You want a gap-free fit where the rafter meets the top of the walls, and where they come together at the peak.

When you're satisfied with your pair of test rafters (and have adjusted their size if necessary), make the entire batch of 34 rafters. Of these, you must add a special feature to 12 of them. Page 81 shows how you should cut 1½-by-3½-inch notches along the top edge of these 12 special rafters to accept 2-by-4 braces. These support the outer pair of rafters that create the overhang. The best way to cut these notches accurately and quickly is by temporarily clamping two sets of six rafters together, marking each set as a group, then cutting the notches with multiple passes from a hand-held circular saw. It's easy to knock out the slivers of remaining wood with a hammer and chisel.

> Your cozy, affordable cabin will make you realize that small really is beautiful!

Total length of the cabin's ridge is 22 feet (20 feet across the building and porch plus 1 foot of overhang at each end), so the ridge board probably will have to be made in two lengths of 2-by-12s. Prepare these now, arranging the joint between them so it lands in one of the spaces between rafter pairs. Next, lay the ridge boards end-to-end on top of one wall plate and then transfer rafter locations onto these boards.

When it comes time to raise the rafters and ridge boards, do one half of the cabin at a time. Raise one pair of rafters at the end of the cabin and another pair in the middle, near the place where the ridge board will end. Fill in the spaces along the wall with more rafters, angling screws so they penetrate the ridge board and sink into the ends of the rafters. Repeat the process for the second half of the roof. Add the 2-by-4 rafter supports, then the four rafters that form the front and back eaves.

Don't worry about a two-part ridge board. The roof sheathing will join these two halves together solidly. I recommend using solid-wood planks that are three-fourths inch thick, not the more expedient option of plywood or OSB, unless you are building in a hurry. The underside of the roof plays a large visual role in this cabin, and sheet woods never enhance the natural backwoods aesthetic. Just remember to lap the roof planks across the area where the two ridge boards meet.

You're now well on your way to finishing your cabin. Add the ceiling joists that tie the cabin together at the top and form the floor of the sleeping loft. Shingle the roof, install doors and windows, and then apply your exterior wall treatment. Once your cozy, affordable cabin has become part of your life, you'll realize something that many folks never understand: Small really is beautiful!